CORRES. CONTROL
OUTGOING LTR. NO.

90 RF 1152

DIST.	LTR	ENCL
LHOFF, F.H.		
EEN, J.H.		
ETZKE, J.C.		
JRLINGAME, A.H.		
VIS, J.G.		
RRERA, C.W.		
RRIS, L.R.		
ANCIS, G.E.		
OODWIN, R.		
ALY, T.J.		
ECKER, E.H.		
RSH, J.M.	X	X
BY, W.A.		
JESTIC, J.R.		
KINLEY, K.B.	X	X
ELLEN, J.B.		
RNELL, R.F.		
TTER, G.L.		
OCES, J.L.		
NER, V.L.		
NECRO, T.H.		
ANNON, W.M.		
NLEUVEN, D.B.		
ANER, B.P.		
UNG, E.R.		
TCHER, D.H.		
RNIVAL, G.J.		
ARMAN, L.K.		
EBERT, J.L.		
FFMAN, R.B.		
AMMAN, R.L.		
IEG, D.M.		
UCENBERG, G.E.		
IMON, E.R.		
WBY, R.L.		
ANER, H.L.		
LASQUEZ, R.N.		
EENWALDT	X	X
HDT, M	X	X
IDERSON, G	X	X
CORRES. CONTROL	X	X
CONTRACT ADMIN		

CLASSIFICATION
UCNI
CLASSIFIED X X
CONFIDENTIAL
SECRET

AUTHORIZED CLASSIFIER SIGNATURE
3-22-90

REPLY TO RFP CC NO.

EG&G ROCKY FLATS

EG&G ROCKY FLATS, INC.
ROCKY FLATS PLANT, P.O. BOX 464, GOLDEN, COLORADO 80402-0464 • (303) 966-7000

March 28, 1990 90-RF-1152

Robert M. Nelson, Jr.
Manager
DOE, RFO

SURFACE WATER INTERIM ACTION FOR OPERABLE UNIT 2

This letter is in response to our receipt of EPA and CDH comments on the draft Phase II RI/FS Workplan (alluvial) for Operable Unit 2 (OU 2). The comments were received February 20, 1990.

EG&G is surprised by EPA/CDH comments that volatile organic compound (VOC) releases to South Walnut Creek and Women Creek were only "discovered" during their review of the Phase II RI/FS workplan, that the releases were not identified in the IM/IRA Plan and that actions were not presented by DOE/EG&G staff to address these releases. The VOC releases are discussed on page 2-65 of the IM/IRA Plan (December 1, 1989). It is noted in the text that, with the exception of trace levels of methylene chloride which appear to be laboratory contamination, these VOC's have never been detected in surface water at the stations farther downstream within the property boundary, (e.g. Pond B-5, Pond C-2 and stations along the South Interceptor Ditch). Therefore, a surface water interim action wasn't proposed as part of the ground water IM/IRA Plan. During January we held several meetings with the regulatory agencies. EPA called attention to contamination on South Walnut Creek in our January 8, 1990 meeting by requesting that well 35-86 (in the South Walnut Creek drainage) be included in the Alternative 1 ground water withdrawal program (see EPA comments transmittal letter and their comment on Section 4.4.1.1). Concern over such releases to South Walnut Creek and Woman Creek were reiterated in CDH's letter dated January 26, 1990. It was stated in that letter that CDH and EPA comments had been discussed with our staff on January 8, 16, and 18, 1990, and that investigation of alluvial and bedrock contaminant migration pathways to South Walnut Creek and Woman Creek are considered of primary importance. Clearly, we did discuss VOC releases and IRA alternatives that address these releases. However, as noted in CDH's letter dated January 26, 1990, "all parties agreed that the draft proposed IM/IRA Plan is based on insufficient information to adequately design an effective IM/IRA for OU 2." Given this situation, EPA, CDH, DOE and EG&G are developing a phased RI approach that will allow expedited collection of data for preparation and implementation of an IM/IRA plan in advance of completion of the final RI report.

Please note that, even though the regulatory agencies state in their letters that this is new information that indicates an "imminent" threat to both Women and Walnut Creeks, the seeps and VOC releases were explicitly discussed on pages 6-9 through 6-19 of the draft Remedial Investigation Report for the 903 Pad, Mound and East Trenches Areas. These pages are attached. The report was submitted to EPA and CDH on December 31, 1987.

ADMIN RECORD

REVIEWED FOR CLASSIFICATION/UCNI
By ______
Date ______

A-OU02-000213

If you wish to discuss this issue, please call me or T.C. Greengard at X7121.

J. M. Kersh
Associate General Manager

TCG:sf

Orig. and 1 cc - R. M. Nelson, Jr.

Attachment:
As Stated

chemistry and radionuclides, reference will be made to Tables 5-6 and 6-5 which show, respectively, ranges of analyte concentrations found in background alluvial ground water and surface water west of the Plant. Surface water analyte concentrations ranges are based on data collected during the 1986 Phase 2 initial site characterization for stations SW-42 and SW-05 on Woman Creek and Rock Creek, respectively. The basis for the background alluvial ground-water ranges is discussed in Section 5. Because the surface water stations are at ground-water seeps or are otherwise along a flowing drainage where interaction with alluvial ground water is not quantified, an analyte concentration will be flagged as possibly indicating contamination only if it is greater than the maximum value specified for either background surface water or alluvial ground water.

6.2.2 Seeps Southeast of 903 Pad Area

There are many seeps downslope to the southeast of the 903 Pad. Surface water stations established at these seeps are designated SW-50, SW-51, SW-52, SW-55, SW-57, and SW-58. Station SW-50 is closest to the 903 Pad, and SW-51 and SW-52 are due south and downslope of SW-50. SW-57 and SW-58 are located in a ditch along the road east of SW-50. Water in the ditch passes under the road south of these locations through a culvert. The discharge of the culvert, SW-55, was sampled and it is noted that although SW-57, SW-58, and SW-55 are physically connected, seepage was only observed at SW-55 in October 1987, indicating that localized ground-water seepage also contributes to the flow at SW-55.

The data indicate that most seeps are contaminated with VOCs. Water at SW-50 shows the highest level of contamination with 1,1-DCE at 140 ug/l, $CHCl_3$ at 84 ug/l, CCl_4 at 1005 ug/l, TCE at 40 ug/l, and PCE at 65 ug/l. Most of these VOCs

were present at concentrations an order of magnitude lower than that observed during the third quarter of 1987 for alluvial ground water at well 1-71 located in this vicinity. This is likely due to volatilization as ground water contacts the air.

Contaminant levels decrease downslope of SW-50. SW-51, south of SW-50, has the next highest level of VOC contamination with 1,1-DCE at 101 ug/l, CCl_4 at 232 ug/l, and TCE at 17 ug/l. $CHCl_3$ was not detected in this sample or in any other sample from seeps in this area. At SW-52, downslope and south of SW-51, the only VOC detected was 1,1-DCE at 73 ug/l. VOC concentration trends suggest that a solvent plume within alluvial ground water is migrating to the south, but the one time sampling of seeps in close proximity to each other does not provide sufficient data to fully support this conclusion, especially noting the volatilization that occurs as ground water surfaces. However, the alluvial ground water flow from the 903 drum storage site is in this direction.

Strontium and major ion concentrations are similar to that observed in the alluvial ground water at 1-71 and 2-71. Strontium was 0.43 mg/l, 0.40 mg/l, and 0.49 mg/l at stations SW-50, SW-51, and SW-52, respectively. This is similar to that observed for well 1-71 during the third quarter of 1987 (0.52 mg/l). Calcium, sodium, chloride, and sulfate concentrations appear to represent a mix of alluvial ground water at 1-71 and 2-71. Although the concentration of oil and grease progressively decreases downslope from SW-50, also suggesting a plume (possibly of lathe coolant), these concentrations are typical of those observed in seeps and surface water at all stations.

As previously mentioned, stations SW-57, SW-58, and SW-55 are physically interconnected, and to an unknown extent flow from SW-57 (and SW-58) contribute to

the flow at SW-55. At SW-57, the station closest to the terrace where the 903 drum storage site is located, the only VOC detected was 1,1-DCE at 48 ug/l. VOCs were not detected at SW-58 but 1,1-DCE was detected at 50 ug/l at SW-55. The absence of VOCs at SW-58 is probably due to spatial variations of VOC concentrations in water exposed to the air. Furthermore, as previously stated, SW-55 receives localized seepage and the physical connection of seeps SW-57, SW-58, and SW-55 is not well defined.

As with other seeps to the southeast of the 903 Pad Area, metals and major ion concentrations simply reflect that observed for alluvial ground water. The oil and grease was at the highest observed concentration (12.3 mg/l) at SW-57 compared to the other surface water stations; however, there are insufficient data to interpret the significance of this finding.

Plutonium concentrations were elevated above background in all of the seeps mentioned above. The concentrations of plutonium ranged from 3.2(1.7) to 55(7) pCi/l. The highest concentrations were to the north near the 903 drum storage site at SW-50 [55(7) pCi/l] and SW-57 [54(7) pCi/l] and decreased to the south to 3.2(1.7) pCi/l at SW-55. However, elevated plutonium was not observed in the alluvial ground water during the second and third quarters of 1987. As these surface water samples were not filtered, and the surface soil is known to be contaminated with plutonium (Section 4.0), these results simply reflect particulate plutonium in the water originating from the surface soils, and thus are not indicative of radionuclides in surface water. These seeps are not connected to other surface water bodies. Other radionuclides were within estimated background levels for alluvial ground water.

6.2.3 Seeps Northwest of Pond C-2

To the southeast of the 903 Pad Area are four seeps near the South Interceptor Ditch designated SW-53, SW-62, SW-63, and SW-64. The only VOC detected was TCE at 20 ug/l, which occurred only at SW-64. TCE was not detected in the alluvial ground water in this vicinity (well 29-87). Plutonium appears slightly elevated relative to background at SW-53 (25±5 pCi/l) and at SW-62 (1.3 ±0.9 pCi/l), but not elevated at SW-64 (0.1 ±1.2 pCi/l). (There are no radionuclide data for SW-63.) As discussed above, any plutonium contamination is presumed to be due to plutonium contaminated soil in the sample. Other radionuclides were within estimated background levels. Strontium concentrations were somewhat lower than that observed for alluvial ground water in this vicinity (well 29-87; 2.7 mg/l). Strontium was present at 0.69 mg/l, 0.97 mg/l, 1.1 mg/l, and 1.1 mg/l for stations SW-53, SW-62, SW-63, and SW-64, respectively. Sodium was at concentrations of 113 mg/l, 99 mg/l, 112 mg/l, and 102 mg/l at SW-53, SW-62, SW-63, and SW-64, respectively. Sulfate occurred at 20 mg/l, 132 mg/l, 118 mg/l and 83 mg/l, at these stations, respectively. This appears to simply reflect interaction with alluvial ground water as sodium and sulfate were 360 and 850 mg/l, respectively, at well 29-87.

6.2.4 Woman Creek Drainage Near Pond C-2

Any impacts to surface water of the South Interceptor Ditch or Woman Creek from the 903 Pad, Mound, and East Trenches Areas would be reflected in the chemistry of the waters in the vicinity of ponds C-1 and C-2, as this location is hydraulically downgradient of these areas in terms of surface water runoff and components of alluvial ground water flow. In this vicinity, the South Interceptor

Ditch (SW-27) and Woman Creek (SW-28) were sampled and analyzed as part of this investigation. Other stations on Woman Creek (SW-29, downstream of Pond C-1, and SW-26, SW-2, and SW-1, all downstream of Pond C-2), and station SW-30 on the South Interceptor Ditch, north of Pond C-1, were dry at the time of sampling in July 1987. Radiochemistry data collected by Rockwell from 1976 to 1986 are also discussed.

At SW-28 on Woman Creek, VOCs were not detected, the nickel concentration was high, and major ions were elevated relative to background alluvial ground water and surface water. Nickel was 0.82 mg/l, a value ten times background with respect to alluvial ground water, and the alluvial ground water in this vicinity (wells 29-87 and 65-86) does not appear to be elevated in nickel. Nickel was not detected in 1986 at this station (Rockwell International, 1986a), and the significance of this finding is unknown at this time. Strontium (0.43 mg/l) was approximately two times the concentrations observed at pond C-2 and SW-32 during 1986 but is typical of the alluvial ground water in this vicinity. Uranium 233+234 [0.13 (0.79)] and uranium 238 [1.6 (1.3)] concentrations were typical of those observed in 1986 at this station and pond C-1, and are somewhat higher than the concentrations observed relative to other upgradient stations on Woman Creek (1986), but are well within the range of background alluvial ground water. Other radionuclides were at background concentrations. The major cations, calcium (66 mg/l), magnesium (15.7 mg/l), sodium (55 mg/l), chloride (35 mg/l), and sulfate (60 mg/l) are at concentrations typical of those observed at this station in 1986 and are somewhat elevated relative to concentrations observed at upgradient stations in 1986. However, the alluvial ground water in this vicinity (well 65-86) has somewhat higher concentrations of sodium, calcium, and sulfate which may simply reflect localized interaction with the ground water.

Historical radiochemistry data for Pond C-1 collected by Rockwell (Table 6-6) show average annual radionuclide concentrations at or near background levels. Occasionally, elevated discrete concentrations of plutonium and americium were noted prior to 1980.

In general, the South Interceptor Ditch at SW-27 has similar major ion chemistry relative to Woman Creek in this vicinity but has higher concentrations of uranium-238. Uranium-238 [5.8(1.7) pCi/l] is at a concentration typical of background alluvial ground water and local alluvial ground water. Strontium was at 0.32 mg/l, typical of the concentrations observed at this station and stations near the old landfill and 881 Hillside in 1986, but higher than at the most upgradient station (SW-37). Again, both the strontium and uranium-238 concentrations probably reflect interaction with the alluvial ground water. VOCs were not detected at SW-27, and other radionuclides were at background levels.

Historical radiochemistry data for Pond C-2 (Table 6-7) show all radionuclide concentrations to be at or near background levels. These data are from 1981 through 1986.

6.2.5 Upper South Walnut Creek

At the Mound Area, station SW-60 is a corrugated metal pipe discharging South Walnut Creek flow which originates to the west of SW-56. Station SW-56 is on a ditch that appears to be seepage from the base of the hill to the south. The ditch is not part of the main flow of South Walnut Creek as the creek is routed beneath this area

by the corrugated metal pipe. Water in the ditch eventually discharges to South Walnut Creek through a concrete pipe (SW-61). The flow in South Walnut Creek upstream of Pond B-4 is primarily the combined flow from the discharge of these pipes (SW-60 and SW-61). A spring located at the base of the hill to the south and downstream of SW-60 and SW-61 was also sampled.

The upper reach of South Walnut Creek as characterized by the discharge at SW-60 contains CCl_4 and above alluvial background ground-water levels of strontium, zinc, and nitrates. CCl_4 was detected at 173 ug/l, strontium at 0.58 mg/l, zinc at 0.59 mg/l, and nitrate at 4.5 mg/l. Radionuclide concentrations were typical of background alluvial ground water, and aside from zinc and strontium, other metals were at or near detection limits. The nitrates and major ion concentrations were typical of the alluvial ground-water in the vicinity of the 903 Pad and Mound Areas. CCl_4 and elevated zinc were present in the alluvial ground water east of this reach of South Walnut Creek at well 17-87 (Mound Area); however, flow through this pipe originates inside the perimeter security zone (PSZ), so the Mound is not the source of this surface water contamination. The source has not been determined at this time.

As mentioned, the flow at SW-56 discharges downstream through a culvert at SW-61. At SW-56, 1,1-DCE was 143 ug/l, TCE was 50 ug/l, and PCE was 72 ug/l. At SW-61, these VOCs were absent except TCE at 6 ug/l, and 1,1,1-TCA at 33 ug/l. At both locations, radionuclide concentrations were typical of background alluvial ground water. Strontium, and zinc concentrations at SW-56 (0.67 mg/l, and 0.27 mg/l, respectively) were typical of the alluvial ground water at the Mound Site (wells 1-74 and 17-87). The organic contaminants are also typical of those in alluvial ground water at the Mound Area. However, zinc and strontium were below or near detection limits at SW-61. (Copper was reported at 0.18 mg/l at SW-61 for reasons that are not

known at this time.) It is clear when examining the major ion data that the flow at SW-61 must be diluted with low total dissolved solids (TDS) water because the major ion concentrations at SW-56 are generally three times that observed at SW-61. The source of this low TDS water has not yet been determined, but it may be the source of the copper and 1,1,1-TCA detected at SW-61.

As with the water at SW-60 and SW-56, the seep, SW-59, located downstream of the confluence of SW-60 and SW-61, has nitrate and major ion concentrations similar to alluvial ground water of the Mound Area. Radionuclides were at background concentrations, and strontium and zinc occurred at 0.73 mg/l and 0.31 mg/l, respectively. Of note was the presence of high VOC concentrations. 1,1-DCE was 133 ug/l, $CHCl_3$ was 40 ug/l, CCl_4 was 605 ug/l, TCE was 62 ug/l, and PCE was 60 ug/l. Aside from the CCl_4, these organics are elevated in the alluvial ground water of the Mound Area. CCl_4 has not been detected at well 1-74, and was present at a concentration of only 48 ug/l at well 17-87. There may be a very localized source of CCl_4 at the Mound Area contributing to this contamination.

6.2.6 B Series Ponds

As previously mentioned, the B series ponds were not sampled as part of this investigation as they are targeted for subsequent investigation as low priority sites. The following discussion is based on data collected for the 1986 Phase 2 initial site characterization and on historical data collected as part of NPDES monitoring.